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THE EFFECTIVENESS AND EVIDENCE OF USE OF EXPLOSIVE INFANTRY AMMUNITION BY SOVIET TROOPS

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A. Introduction

In 1941 during the Soviet War frequent cases of wounds from infantry weapons were encountered by the Germans, in which the nature of the wound was not fully in keeping with the effect of legal small-caliber ammunition. It is possible that some of these may have been dumdum bullet wounds. The Ammunition-Collecting Unit of the Army Medical School is already in possession of a number of lodged bullet specimens taken during the campaign against the Soviets, which, in view of the condition of the wound, are to be attributed to dumdum bullets. Insofar as can now be ascertained, this dumdum ammunition was fashioned by individual soldiers by removal of the tip of the bullet's jacket. Some other wounds of this type may often originate from explosive infantry ammunition. It is the purpose of this article to make these facts known and to furnish possible proof for one of these suppositions.

It is known that the Russians used an infantry bullet with an explosive charge in World War I. A type of Soviet bullet has now been found which has an explosive and an incendiary charge in the head and which explodes in the target with grave effect. It is a long-pointed bullet of the ordinary 7.62-mm Soviet infantry caliber with a slightly torpedo-shaped, tapered base. The bullet is 3.83 to 3.9 cm long and weighs 9.66 to 10.38 grams. It may be recognized by the red lacquer on the point and on the cap.

According to the printed Soviet specifications ("Special Cartridges for Infantry Weapons, Description and Notes on Use," Final Edition, 1940, [printed] by the Artillery Administration of the Red Army of Workers and Peasants) and

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[illegible] (see figure 1).

The jacket of tombac-plated soft steel (1), [illegible] portion an incendiary compound (2), which is connected to a detonator (3). The [illegible] nator (5) enclosed in a hollow extension (4b) of the lead core. Within the tombac-plated iron ignition cooling (6) is an iron [illegible] striker (7a). The safety ring (8), a brass spring support put on at the [illegible], has the trigger end against the igniter casing while the slightly widened head end secures the striker in an elastic grip. A 1.25 mm aperture in the top of the igniter casing permits the striker to penetrate forward to about 0.2 cm upon its release by the safety ring. The lower end of the striker rests on a brass brake disc (9d). The igniter mechanism is separated from the lead core by a brass steel base plate (9e).

The action of the shell is evidently [illegible] the diagram. When the bullet is at rest, the elastic safety ring holds the striker and the bullet is safe to handle and carry. When the bullet strikes the target, the striker's inertia carries it out of the grip of the safety ring forward through the casing to the detonator which in turn explodes, and at the same time activates the incendiary. The procedure thus amounts to impact detonation. Accordingly, the bullet is a modified [illegible] shell.

Undoubtedly, the use of such bullets on human beings is a breach of international law, and is a violation of the note of the Petersburg Convention, 11 November 1868, and those of the Hague Convention, 29 July 1899.

It is true that similar bullets are produced and used by several nations for range adjustment of guns in peacetime. However, it has been proven that the Soviet ammunition is being used for purposes other than for training. We have found the ammunition not only in the ammition depots of large troop corps, where it might easily have been destined for peacetime purposes, but also for mortars, in drums, clips, and belts for machine guns. These were generally distributed and were discovered in field positions. Additional proof was presented when wounded German soldiers were found to have these bullets lodged in them. In these instances it was ascertained that, in addition to machine-gun fire from ground positions and from aircraft, infantry rifles were also used.

There are frequent instances of radical and troop reports erroneously identifying as explosive bullets other kinds of munitions with yellow or with black or violet-red paint markings. This is explained by the fact that the explosive-incendiary bullets -- which have been described here as having a red-lacquered point -- do not make up an entire machine-gun belt, but are inserted as every third, fourth, or fifth round.

Furthermore, it is known through the aforementioned "Special Cartridges for Infantry Weapons" that the ammunition designated as "Incendiary ranging bullet 7.62 mm" is not being used on live targets merely by chance. Its use in ground combat is expressly planned. Along with the description of the effect of the bullet, it is mentioned that the bullet, suitable for igniting gasoline when firing on aircraft, acts like an explosive bullet on the live target.

A list of other Soviet infantry ammunition, well known to us, is given below.

No 1a -- Short, pointed bullet; tombac-plated, soft steel jacket, lead core; tombac color, no paint markings.

No 1b -- Short, pointed bullet; copper and nickel-plated, soft steel jacket, lead core; nickel color, no paint markings.

No 2a -- Heavy, long-pointed bullet; tombac-plated, soft steel jacket, lead core; yellow point.

No 3b -- Heavy, long-pointed bullet; copper and nickel-plated, soft steel jacket, lead core; yellow point.

No 3 -- Pointed, steel core; tombac-plated, soft steel jacket, steel core, lead casing; black point.

No 4 -- Pointed, steel core, older type; nickel jacket, copper point, inner copper casing, hardened steel core; copper point.

No 5a -- Pointed, tracer; tombac-plated, soft steel jacket, lead core, base casing with tracer composition; green point.

No 5b -- Pointed, tracer; tombac-plated, copper-and nickel-plated jacket, lead core, base casing with tracer composition; green point.

No 6 -- Pointed with steel core, tracer; tombac-plated, soft steel jacket, steel core, lead casing and tracer composition; violet point with red primer cap.

No 7 -- Pointed with steel core, with incendiary effect; tombac-plated, soft steel jacket, steel core, base casing with tracer composition, top incendiary composition between core point and jacket; violet and red point, red primer cap.

No 8 -- Pointed, steel core with incendiary effect; tombac-plated, soft steel jacket, steel core, base casing; black and red point.

No 9 -- Explosive, incendiary bullet; tombac-plated, soft steel jacket, lead core, detonator and incendiary; red point, red primer cap.

It is evident that, like No 9, the use of No 7 and No 8 with their incendiary effect against personnel is also contrary to international law. No 4 is also in this group since it is a semijacketed bullet.

Accordingly, it is clear that the Soviets have violated international law by producing an explosive ammunition for use by infantry troops on human targets.

To prove this point, exhaustive firing tests were conducted on inanimate targets (parts of dead horses and other inanimate targets). The results obtained were substantiated and supplemented by observation of German casualties and corpses of Russians, who had been hit from behind.

B. Tests

1. Firing Into the Ground

In preliminary tests, one round each was fired at ranges of 50 and 200 meters into loosely piled earth. An observer under cover near the target reported spurts of flame and rather loud reports in both cases.

The flame and report were noted in all other tests.

A furrow 20 cm long and up to 15 cm wide was noted on the upper edge of the earth embankment in both cases. The sides, sloping towards the bottom, were covered in many spots with a gray-black, smoky mass. Characteristic bullet fragments were found over a surface area of about 30 cm in the surface layer of the embankment. Gray smoke was seen to hover above the impact point directly after the hit. A distinct odor reminiscent of powder fumes was still perceptible at the target a minute after impact.

2. Firing Into Water

Two rounds were fired into water at a range of about 30 meters. The

[redacted] on caliber which they threw up were considerably higher and broader than those formed by similar shots with German and Russian heavy [illegible] ammunition. Naturally after the water column had fallen back [illegible] the smoke with the explosive ammunition. The sound of a report could not be heard because of the distance involved.

3. Firing Into Cardboard and Wooden Board

The rounds were fired at ranges of 50 and 200 meters. To catch the bullets, a series of boxes containing bags full of sawdust were arranged behind the target. Four boxes, in all, 50 cm deep, were set up one behind the other at 50-cm intervals.

a. Cardboard Target

A series of ten 0.07-cm cardboard sheets suspended at 20-cm intervals, one behind the other, served as a target.

This test was designed to determine the tendency of the bullet to ricochet. It was shown that the Soviet explosive-incendiary bullet exhibits a particularly great tendency to ricochet. The bullet's behavior is very unusual. Two of the rounds fired at 50 meters were off from the sixth sheet on, as evidenced by the increasing length of the perforation profile from sheet to sheet. One of the rounds fired at 200 meters was a ricochet from the seventh sheet on. In the sheets behind the seventh there was evidence of deflection in the case of every bullet except one fired from 200 meters which penetrated to the tenth sheet, leaving a round hole. Explanation for this behavior obviously lies in the pronounced rearward shift of the center of gravity to the lead-filled base of the bullet.

Furthermore, despite the low resistance of the target, three of the rounds, all fired from 200 meters, exploded in the series of boxes behind the target. Fragments of these bullets were found imbedded in the sawdust. The other bullets were found intact. In the case of the exploded bullets, the dense smoke film was always found near the location of the bullet sections, either on the bag or the cardboard box. As in all other tests, burn traces were not found. The reason for the failure of the bullets fired at 50 meters, to explode may lie in the fact that their yaw is more regular and more pronounced. Naturally, the striker will not move forward if the bullet strikes sideways.

b. Wooden Boards

Ranges were 50 and 200 meters. The wood was pine, 2 cm thick, without knots. The bullets were fired perpendicular to the direction of the grain.

Flame and report marked explosion in every case. However, explosion occurred only in that part of the trajectory beyond the board. The 50-meter shot exploded on entering the second box. One 200-meter shot, after touching the framework holding the board, exploded in the first cardboard sheet only 10 cm beyond. The other 200-meter shot was lost in the air. In both cases, the perforation in the wood was free of smoke film or other indications of explosion. However, it is quite evident that, as in the case of some of the rounds fired at the cardboard targets, explosion was caused by target resistance. In the case of the 50-meter round, the bullet did not explode until after it had passed through the wood, the cardboard series and the first box of sawdust, a distance of about 3.5 meters in the bullet's trajectory; but the bullet fired from 200 meters traveled only 10 cm beyond the board before it exploded. We have, therefore, a fair indication of the difference in velocity at 50 and 200 meters. In considering this fact, it is to be remembered that in the latter case the resistance was increased somewhat by the bullet's striking the target's supporting framework.

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4. Firing Into Parts of Slaughtered Horses

On the basis [illegible] published, the following were used as targets: soft parts of the shoulder, shoulder with scapular bones, upper foreleg with bones in shoulder joint and in shank, soft portions of the hind leg, stomach, intestine (caecum packed in sandbag), and a hide and muscle layer from the chest and abdominal wall. The parts were used one to 2 hours after the horse had been killed. The range in every case was 50 meters.

For these tests the cardboard sheets were removed. The sawdust-filled boxes were placed about 1.5 meters behind the target object.

In the case of the targets which offered low resistance the results were similar to those obtained when firing on the cardboard sheets. The bullets either exploded in back of the target or were stopped there intact. The effect on the targets is given below (all figures are in cm):

No	Target	Muscle Thickness	Entry	Exit	Explosion in Box
11	Hide-muscle layer	∅	0.5	0.6	∅
12	Hide muscle layer	1.5	0.5	0.8	+
13	Shoulder, soft part	6.0	0.5	1.2	∅

The case of the targets with greater resistance (thick soft layers, bone, stomach, intestine) presents an entirely different picture. The bullet exploded in the target, causing severe rupture of tissue and forming jagged exit apertures. The following table shows results of the tests:

No	Target	Soft Layer Thickness	Bone Type, Thickness	Length of Rupture Zone	Entry	Exit	Max Width	Smoke Film in Target
14	Shoulder, shoulder blade	6	Shoulder blade 1.5	7:3.5	0.4	2.5:2	7:4	+
15	Upper leg with hit on Epiphysis	3	Epiphysis 10	to 3.5:3	0.5:0.3	4:3	8.4	+
16	Upper leg with hit on shaft	8	Diaphysis 3	10	0.5:0.3	6:3	6:3	+
17	Hind leg, without hit on bone	15	--	--	0.6:0.3	4:2.5	6	+
19	Stomach	--	--	--	0.5	35:15	35:15	+
20	Caecum	--	--	--	0.8	25:20	25.20	+

The results of the tests are evident from the foregoing tables. It is understandable that a change in range, with target resistance remaining the same, is not without significance in connection with the occurrence of the explosion. There is a short interval between the release of the striker and the explosion itself, and the results of such a change, with consequent increase or decrease in velocity, will be similar to the effects already described (Section B, 3,b).

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The [illegible] gray-black smoke in the vicinity of a cave-like dilatation which is usually near the aperture of exit. Occasionally, if looked into the aperture of exit without separating [illegible], in cases where the bone is hit, the smoky deposit begins near the bone while the dilatation, likewise lined with the deposit, is noticeable only beyond the point where the bullet leaves the bone. Dilatation and smoke together indicate the point of explosion. There may be some blow back of explosive gases with smoke particles between the bone fragments. In appearance, the smoke is very similar to the powder smoke found deep in gunshot wounds inflicted by small arms at absolute point-blank range.

The smoke is mostly attributable to the incendiary element. A particularly notable fact is that the incendiary was observed to have no other effect on the tissue. As was evidenced in the other tests, the brief spurt of flame leaves no burn traces. However, as the Soviet specifications state, the bullet will have an incendiary effect with a hit on a gasoline tank.

The presence of the smoke provides the distinction between wounds from tissue bullets and dumdum bullets in the usual sense. The lead powder often found in dumdum wounds has an entirely different appearance. Moreover, its occurrence does not always coincide with the cave-like dilatation also common in dumdum wounds. Shrapnel wounds are frequently similar in nature to those from dumdum and explosive bullets. However, the appearance of their apertures of entry will provide certain identification.

Results of the animal test allow us to establish the origin of wounds of this nature on human beings. The nature of the results of disintegration of the bullet will be treated later. During the short series of tests there were no instances of bullets lodging in the target objects. The occasional finding of characteristic bullet fragments in wounded persons, however, may be attributed to the resistance of the skin layer on the exit side.

C. Additional Observations

1. Soviet Corpses

Dissections of Soviet corpses which had been found shot from behind, gave evidence, substantiated by the information obtained from the animal tests, of the use of explosive-incendiary bullets in a number of cases. These included six head wounds and five chest or chest abdominal wounds.

In every instance, diagnosis was based on the identification of smoke deposits which, in the case of the torso wounds, were always coincident with a large, well-defined cavity formation. Diagnosis was somewhat more difficult in the case of the head wounds since the burst skull, characteristic of most of the cases is known to be caused also by nonexplosive infantry ammunition through hydrodynamic action. Here then, the smoke was of particular importance in identifying the nature of the origin of the wound.

It is conceivable that, since our observations depended so extensively on the presence of smoky deposits, one might be misled in cases where ordinary ammunition was used at absolute point-blank range. It is a fact, well known from suicide cases, that the presence of smoke deep in the wound is one of the chief indications of a shot fired with the barrel of the gun pressed against the body. However, it is a simple matter to distinguish this symptom from the indications which we have described from our findings. When a wound has been inflicted from absolute point-blank range, the smoke begins at the aperture of entry or near it on the inside, usually with the formation of a "smoke pocket" outside of a bone surface somewhat further on in the bullet's path. However, with wounds from explosive bullets, the smoke deposit is first evident some distance beyond the

aperture of entry. This appears is particularly distinct in the case of chest wounds, where the smoke deposit begins in the path through the lungs or through the heart and [illegible] coincides with the dilatation of the internal wound. This dilatation was not so evident in the case of the head wounds, since the skull burst in about the same way as it might with other kinds of ammunition. However, the removal of the smoke deposit from the aperture of entry is also clear here. The apertures of entry through bone surfaces in cases which we examined were always small, less than the caliber of the bullet, and free of cracks, which is not the case with wounds of this type incurred from point-blank range.

A description of individual cases is given in the following table:

Chest Shots
(Dimensions in cm)

Serial No	Observation No	Parts Affected: Ribs Rear	Ribs Front	Lungs	Heart	Other	Entry Aperture	Exit Aperture	Max Width	Smoke Deposit
1	I	ϕ	+	+	+	ϕ	0.6	7:6	8:7	Heart
2	V	ϕ	+	+	+	ϕ	0.7:0.5	12:6	12:10	Heart to exit
3	IV	(+)	+	+	+	ϕ	0.6	11:8.5	11:8.5	Lung to exit
4	III	+	+	+	ϕ	ϕ	0.5	16:13	16:13	Lung to exit
5	II	+	+	(+)	ϕ	Colon	0.6	6:6	6	Colon to exit

See table on following page.

Head Wounds
(Dimensions in cm)

Serial No	Observation No	Entry Size	Entry Region	Exit Aperture	Exit Center point	Brain Blown Out	Part of Skull Shattered: Vault of Cranium	Base	Facial	Thickness of Bone at Entry	Smoke Ring
1	VI	0.6	Occiput, right	30:30	Right eye	Cerebrum	+ +	+ +	+ +	0.5	Bone aperture inward
2	VII	0.6	Occiput, right	30:29	Forehead, low, center	Cerebrum and cerebellum	+ +	+ +	+	1.0	Bone aperture inward
3	XI	0.4-0.6	Occiput, slightly left	28:25	Forehead, low, center	2/3 left, 1/3 right cerebrum	+ +	+ +	+	0.6	Bone aperture inward cerebral medium e
4	IX	0.5	Occiput, high right	16:14	Forehead-vertex region	∅ (cerebrum detached)	+ +	+	∅	0.7	Bone aperture inward
5	X	0.9:0.5	Occiput, low left	12:8	Naso-buccal region	∅ (rear cranial fossa only)	(+)	+ +	+ +	0.2	Vessel wound only
6	VIII	0.5	Nape of neck, slightly right	15:14	Naso-oral region, left	∅ (only through medulla oblongata)	(+)	(+)	+ +	--	Meningeal region and tongue

Study of the [illegible] explosion within the body, even on a human target, requires great resistance. The range could not be determined accurately, but under the circumstances a short distance of about 10 to 15 meters is assumed.

In the case of the torso wounds where the heart was hit, that phase of the wound marked the explosion. In the case of the other two torso wounds, in one instance (Observation III) a rib hit on the side of entry and, in the other instance, a rib traverse and a colon hit were apparently responsible for the explosion.

In the case of the head wounds, evidence points to the resistance of the vault as the main cause of explosion since the immediate inner side of the bone aperture showed smoke. However, it must be assumed that the brain, as an incompressible and watery mass, also contributed to originating the explosion. This is illustrated in Observation XI (Serial No 3) where the smoke was spread as far as the cerebral peduncle. In addition, both of the low occiput-face cases (Observations I and VIII, Serial No 5 and No 6) where no considerable brain mass was penetrated, show smoke not at the bone aperture of entry, but toward the aperture of exit in the facial region.

It is particularly notable that the explosion has a significant effect on the dimensions of the wound. The size of the aperture of exit in the case of the chest wounds is particularly striking. Under no circumstances would an ordinary infantry bullet produce a 16 x 13-cm aperture of exit. Furthermore, where the most direct manifestation of the explosion can be seen in the sudden, cave-like dilatation in the bullet's path through the body, the explosion, through the medium of an intense water hammer action, has a particularly adverse effect on the heart. In two cases we found definite and anatomically comprehensible effects of this phenomenon. In one case (Observation III, Serial No 4) the left lung was traversed and the pericardium was not exposed, but there was an abrasion, 2 x 1.5 cm, of the pericardial adipose tissue with laceration of the wall of the left descending coronary artery and hemato-pericardium. In the other case (Observation II, Serial No 5) with the thorax-epigastrium wound, there were lacerations of the gastric mucosa near a fig-size wall hemorrhage, with the muscular wall intact.

In a similar way, the characteristics of the head wounds were also beyond the normal nature of the effect of ordinary infantry ammunition. The longer the path through the brain, the greater the shattering of the skull and the more extensive the removal of the brain. Cases 1 to 3 in the table illustrate this. The extent to which the bone is shattered is extremely great (Observation XI, Serial No 1).

In the case of a short path through the brain (Observation IX, Serial No 4), the striking fact is that though the brain is not displaced, there is complete detachment of the parts of the cerebrum from each other and from the cerebral peduncle.

In No 5 and No 6 of the head wounds, where the circumstances would never presuppose an explosive action with the use of ordinary infantry ammunition, the explosive bullets caused extensive explosion cavities and very large apertures of exit.

2. German Casualties

Though observations to date are based on only a few isolated cases, it was deemed necessary to include them in order to make the information obtained available for future reference. Evidence of extensive use of the ammunition is also witnessed by the fact that again, as in World War I, wound casualties frequently report that they heard an explosion at the moment of impact.

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At this time there has been a total of seven case observations.

a. This instance (shot from aircraft) involves a bullet lodged in the thigh. The aperture of entry, to the side of and below the greater trochanter, was the size of the little finger. The bone was not affected. A large muscle wound cavity with torn sides was exposed by incision; in addition, the intermuscular tissue over the entire frontal and lateral portion of the thigh was ruptured.

The wound cavity was lined with a smoke film. Though these films are designated in the clinical report as "burn traces," there is no doubt as to their smoke origin. It should be noted here that is is old practice in forensic medicine for clinicians to include as "burn traces" smoke deposits such as occur in wounds inflicted at absolute point-blank range.

During transport, the bullet emerged through the aperture of entry and lay in the underwear.

It is to be mentioned that extensive subcutaneous bleeding with a spreading mottling of the skin gave the first impression of gas gangrene. However, this was disproved by the findings of the operation.

b. In the second case, according to the clear, confirmed statement of the wounded man, the shot was fired from a rifle. The range was estimated at 60 to 70 meters. Report of an explosion was not detected.

No further data is available on the immediate findings. The typically lodged bullet was found by operation a month later near a fistulous cavity in the thigh.

c. and d. For these two cases, we have only the bullets. It is known that the bullet in the latter case was fired from an airplane in an attack on a main assembly area.

e. Information on the character of the wound in this case is still lacking. The bullet, not then obtainable, was clearly described as "the bottom half of an infantry bullet having a hole of about 2 mm in the center, in which could be seen a small pin."

f. and g. In these two cases, the bullet travelled through the body. The apertures of entry were small, less than the caliber of the bullet in one case, and the apertures of exit were abnormally large. Extreme dilatation of the internal wound was evident in both cases. The possibility that an ordinary dumdum bullet might have caused the damage was ruled out when an X-ray of one of the casualties failed to reveal any trace of fragments. Failure of the lead core in explosive bullets to disintegrate is not unusual, as will be shown below.

There is still a question whether symptoms of poisoning might originate from the explosive and incendiary elements, as is the assumption in the case of tracer ammunition. This is improbable, however, since explosive and incendiary elements are consumed to a great extent in the explosion; therefore, the substance, which has not yet been analyzed, cannot attain resorption. Nevertheless, there may be instances in which the point of the bullet, i.e., the part which contains the incendiary, will break off and reach the body intact. Such an instance will be referred to later on. Extensive observations on poison symptoms should be made in all pertinent cases.

D. Examples of Bullet Impacts

Identification of bullets lodged in a target simply by means of their known color markings is impossible. Only in exceptional cases is there any

indication in the target of the color marking of a Soviet bullet of any type.

The processes which occur within the bullet, primarily of interest to ballistic specialists, are discussed here only insofar as they pertain to problems concerning the wounds.

The most frequent result of explosion is the lateral rip in the upper third of the bullet and expansion of this section. The igniter component with the striker may remain intact, or it may come out. The base plate is so characteristic in form and dimension that, even if found alone, it will denote the case of this bullet. If the base plate is missing, its bearing surface, the smooth top of the lead core will be in evidence. The igniter component's lead casing is also a clear indication. Occasionally, the igniter component provided immediate identification.

In some cases, the jacket alone provides identification. The inner surface of the explosive-incendiary casing always bears a dense film of black-gray smoke, which is attributed mostly to residue from the incendiary. In the lower portions of the bullet, i.e., on the upper edge of the lead casing, there is a coating of fine lead particles, silvery when fresh.

The dimensions of the individual parts, derived from a large number of separate measurements, are as follows:

Part	Length (mm)	Diameter (mm)
Bullet	38.7	7.9-8.1 (cal 7.62)
Iron igniter casing	11	5.9
Safety ring	6.2	4.5 (approx)
Striker	9 (approx)	3.35
Iron base plate	1.4	5.9
Brass base plate	0.7	4.9

The target hit by the bullet in Figure 11 offered considerable resistance. The point of the bullet broke off and was lost. The igniter component was detached and its three main parts were recovered in the retaining system beyond the target. The deformity of the bottom of the bullet is reminiscent of the ordinary dumdum.

It is to be noted that the lead core does not undergo any considerable decomposition. It has already been mentioned that the lead casing around the igniter component remains fairly intact. There is some sweating of the lead at the top of the casing, attributable to the heat of the explosion. Spectroscopic examination of the smoke film in the target showed that that substance also contains lead. However, the mechanical decomposition of the lead core is limited mostly to slight ripping of the lead casing. Additional mechanical stress on the lead core is frequently evident in a sausage-like protrusion of the lead at the bottom of the bullet, also frequently observed in the case of legal-pointed bullets. Since this phenomenon is not present in every case it may be more a result of reaction to target resistance than a result of the explosion.

The absence of any notable decomposition of the lead core is an important indication as to the action of the bullet within the target. The severe damage to the tissue is not, as it is in the case of ordinary dumdum bullets, the effect of an explosion of the bullet's surface due to dispersion of the lead core. These bullets, on the contrary, cause the formation of a cavity in the target body through the action of the explosive gases alone. This is also

substantiated by the condition of the wounds. It should be noted here that according to the test results, and from observations on corpses and wound casualties, there were no indications of decomposition of the lead in the wounds. It is true that the bullets will break up and that lead particles part of the lead core will be destroyed. Nevertheless, we maintain that extensive decomposition of the lead core is not a part of this bullet's typical course of action. The case described (Section C, 2,a) bears obvious proof that the pressure of the explosion contributes greatly to the effect.

The reaction of the bones leads to the same conclusion. It is true that in the tests on horses the bone was no more shattered than it would have been if other types of flat trajectory ammunition had been used. On the other hand, skull bones of the Soviet corpses were always shattered to a great degree. The explanation is simple and supports the conclusion that the important factor in the effect of these bullets lies in the pressure of the explosion. Within the closed skull cavity the force of the explosion acts with the hydrodynamic forces toward the outside and intensifies the bursting of the skull. However, when hitting other parts of the body, the force is directed toward the lower resistance of the soft tissues and the shattering of the bone is left mostly to the action of the bullet itself. Therefore, in this latter case, the bullet's shattering effect is no more striking than in the case of legal-pointed bullets.

An unusual condition is shown in Figure 12. Here the bullet went through the soft part of the shoulder of a horse and was stopped in sawdust, the point broken about one-third of the way down without exploding. Some of the incendiary elements, a shining, light grayish-white powder, remained in the bullet. This was a rare occurrence in which the bullet, its striker mechanism made inactive due to transverse flight after passing through a target of moderate resistance, buckled without exploding on the low resistance of the retaining system in back of the target. Such a phenomenon is observed occasionally in the case of certain ordinary, jacketed bullets.

This condition makes it necessary to observe a certain amount of caution in examining lodged bullets. In this case, the incendiary element might have been ignited during careless probing with a needle. It is also to be noted that lodged explosive bullets may be found intact. As such, they are still dangerous and must be handled carefully. There already have been several accidents in attempts to saw open the explosive bullets. Danger will be best avoided by forwarding all lodged bullets of any type through channels to the Army Medical School. All pertinent information, including particulars on the casualty, information on the hospital, and the sick report book numbers should be included.

E. Conclusion

1. Contrary to international law, the use of infantry explosive bullets (incendiary) against personnel is proven by the discovery of this type of ammunition, red-lacquered on point and primer cap, in circumstances indicating that it was destined for use in the field, and by the finding of bullets lodged in German casualties. Furthermore, the Russians have printed specifications for the bullet.

2. Firing tests on horses and other objects, and observations on German casualties and Soviet corpses have shown that the bullets explode in the target under certain conditions of resistance, and that the pressure of the explosion heightens the extent of the injury.

3. These are the indications for identifying the wound as being caused by an explosive-incendiary bullet:

a. Sudden dilatation of the internal wound, frequently extending to the aperture of exit;

b. Smoke film beginning deep in the wound;

c. A typically deformed lodged bullet or any of its [illegible] some of which may be recognizable through roentgenological examination.

Supplementary Observation

While this article was being printed, another German casualty, wounded by explosive incendiary ammunition, came to our attention when the bullet was received here. The case involved a thigh wound. Additional information has not yet been received.

The condition of the bullet is unusual. The top of the jacket remained intact, the lower part was ripped on the side and bent out. The lead core and distinctive igniter mechanism were expelled at the bottom. This form of disintegration resembles conditions frequently found in the case of ordinary jacketed bullets; the usual disintegration process evidently was altered in this case through the one-sided counteraction of target resistance (bone) with the bullet striking the bone sideways.

/Appended Figure 1 follows. Other figures, photographs, were not reproduced but are available in the original document: AGO, GMDS No V-49-b-12/1. Captions for these photographs are appended here./

CAPTIONS TO PHOTOGRAPHS

Figure 2. Observation III: Russian corpse, aperture of exit, left side of chest.

Figure 3. Observation VI: Russian corpse, complete bursting of skull and removal of brain.

Figure 4. Casualty case d. Lateral rip and expansion below the point, striker point forward.

Figure 5. Casualty case b. Same as Figure 4 with rip and expansion extending somewhat further back. Striker has fallen back.

Figure 6. Casualty case a. Top third of bullet broken off. Remainder of bullet with striker clumped.

Figure 7. Test 6 (firing through 10 cardboard sheets, 200 meters). Jacket sheared from top third of bullet. Separated igniter component intact.

Figure 8. Test 4 (2-cm wood board, 50 meters). Long rip in side of jacket. Jacket torn far up in point. Striker and safety ring locked in. Lead expelled toward the bottom.

Figure 9. Casualty case c. Long lateral rip and expansion of jacket. Igniter component missing. Base plate (a) remains, with lead casing (b) of igniter component.

Figure 10. Test 12 (horse, hide and muscle, 50 meters). Similar to Figure 9, with base plate cut (arrow); lead expelled at bottom.

Figure 11. Test 16 (horse, upper foreleg, hit on bone shaft, 50 meters). Bullet disintegrated. Igniter component broken into casing (a), safety ring (b), and striker (c); striker point flattened. Bottom of jacket (d) buckled from top and ripped; lead (e) from bottom of bullet forced into mushroom shape and compressed.

Figure 12. Test 13 (horse, shoulder, hit on soft part, 50 meters). Transverse hit, point broken off without explosion. Remainder of incendiary (arrow).

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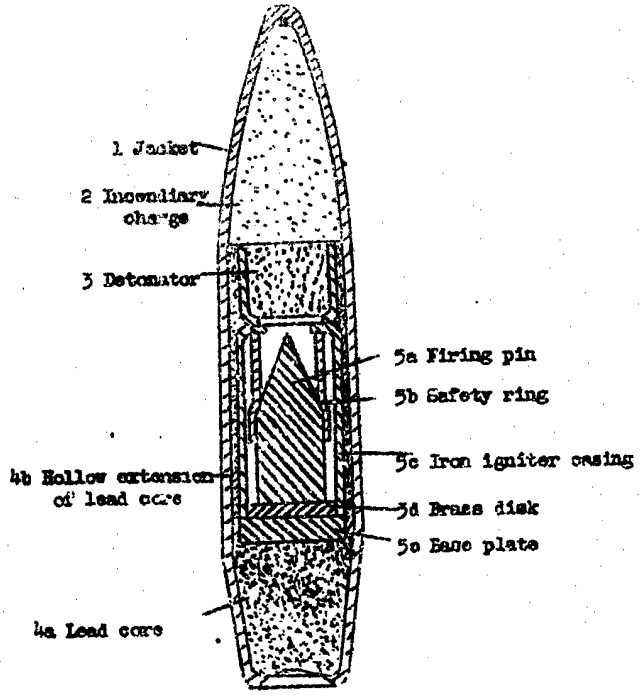

Figure 1. Russian Infantry Explosive-Incendiary Bullet

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